



FCC RF Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : XT2301-4
FCC ID : IHDT56AH3
STANDARD : 47 CFR Part 2, 22(H)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)
TEST DATE(S) : Nov. 17, 2022

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia



Sporton International Inc. (Kunshan)

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG282619-02A	Rev. 01	Initial issue of report	Dec. 01, 2022



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1053; §22.917(a);	Field Strength of Spurious Radiation	$< 43+10\log_{10}(P[\text{Watts}])$	PASS	Under limit 27.67 dB at 2510.00 MHz

Note:

This is a variant report for XT2301-4. The change note could be referred to the XT2301-4_Operational Description of Product Equality Declaration which is exhibit separately. Based on the similarity between current and previous project, only the related test cases from original test report (Sporton Report Number FG282619A) were verified for the differences.

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1 General Description

1.1 Applicant

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.2 Manufacturer

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2301-4
FCC ID	IHDT56AH3
IMEI Code	Radiation: 354336350036455/354336350036463
HW Version	PVT
SW Version	TTR33.128
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Modification of EUT

No modifications are made to the EUT during all test items.

1.5 Specification of Accessory

Specification of Accessory				
AC Adapter 1 (US)	Brand Name	Motorola(Chenyang)	Model Name	MC-1251
AC Adapter 1 (EU)	Brand Name	Motorola(Chenyang)	Model Name	MC-1252
AC Adapter 1 (UK)	Brand Name	Motorola(Chenyang)	Model Name	MC-1253
AC Adapter 1 (AU)	Brand Name	Motorola(Chenyang)	Model Name	MC-1255
AC Adapter 1 (AR)	Brand Name	Motorola(Chenyang)	Model Name	MC-1256
AC Adapter 1 (BR)	Brand Name	Motorola(Chenyang)	Model Name	MC-1257
AC Adapter 2 (US)	Brand Name	Motorola(AOHAI)	Model Name	MC-1251
AC Adapter 2 (EU)	Brand Name	Motorola(AOHAI)	Model Name	MC-1252
AC Adapter 2 (UK)	Brand Name	Motorola(AOHAI)	Model Name	MC-1253
AC Adapter 2 (IN)	Brand Name	Motorola(AOHAI)	Model Name	MC-1254
AC Adapter 2 (AU)	Brand Name	Motorola(AOHAI)	Model Name	MC-1255
AC Adapter 2 (AR)	Brand Name	Motorola(AOHAI)	Model Name	MC-1256
AC Adapter 2 (BR)	Brand Name	Motorola(AOHAI)	Model Name	MC-1257
AC Adapter 2 (CHILE)	Brand Name	Motorola(AOHAI)	Model Name	MC-1259
Battery	Brand Name	Motorola(ATL)	Model Name	PF46
Earphone	Brand Name	Motorola(Lyand)	Model Name	MI181C(SH38D62338)
USB Cable1	Brand Name	Motorola (Saibao)	Model Name	SC18D24968
USB Cable2	Brand Name	Motorola (Saibao)	Model Name	SC18D71644
C to HDMI HDMI/USBC Cable 1	Brand Name	Motorola (Linxee)	Model Name	SC18D02146
C to HDMI HDMI/USBC Cable 2	Brand Name	Motorola (Linxee)	Model Name	SC18D38847
BT remote	Brand Name	Motorola (Linxee)	Model Name	MR-01



1.6 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH04-KS	CN1257	314309

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH04-KS	AUDIX	E3	6.2009-8-24al

1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2, 22(H)
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

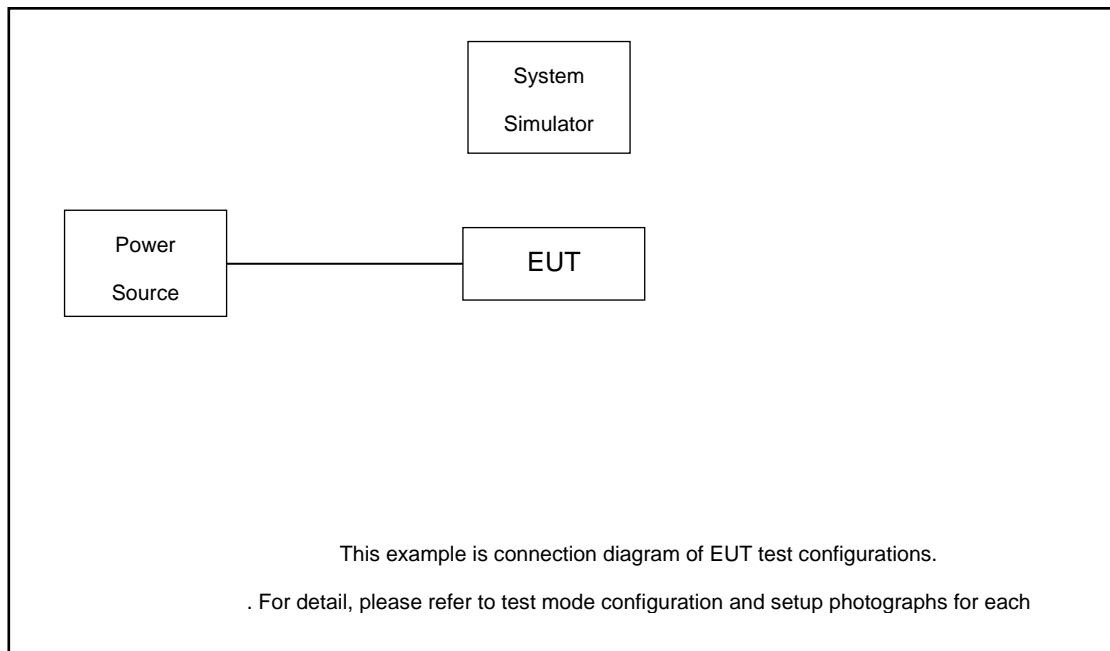
1. 30 MHz to 9000 MHz for GSM850.

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Modes	
Band	Radiated TCs
GSM 850	■ GSM Link

2.2 Connection Diagram of Test System



The EUT has been configuration operated in a manner tended to maximize its emission characteristics in a typical application.



2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Base Station	Anritsu	MT8820/8821	N/A	N/A	Unshielded,1.8m
2.	Power Supply	GWINSTEK	PSS-2002	N/A	N/A	Unshielded, 1.8 m

2.4 Frequency List of Low/Middle/High Channels

Frequency List				
Band	Channel/Frequency(MHz)	Lowest	Middle	Highest
GSM850	Channel	128	189	251
	Frequency	824.2	836.4	848.8

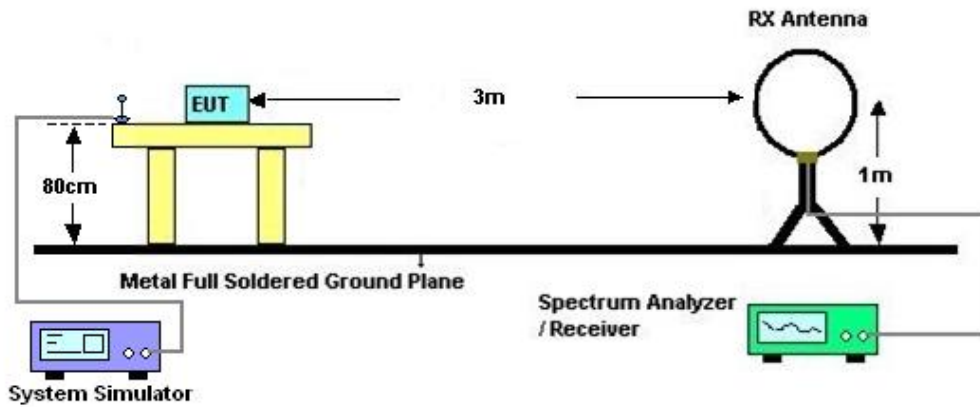
3 Radiated Test Items

3.1 Measuring Instruments

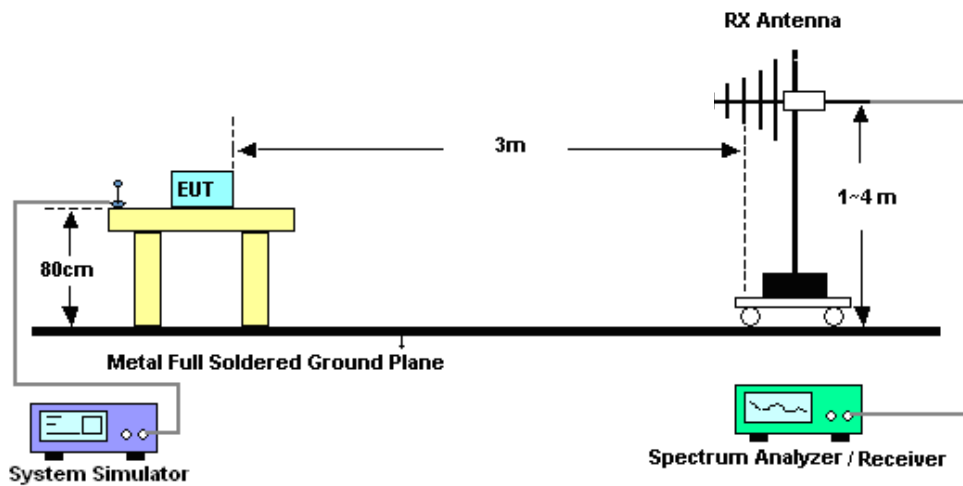
See list of measuring instruments of this test report.

3.2 Test Setup

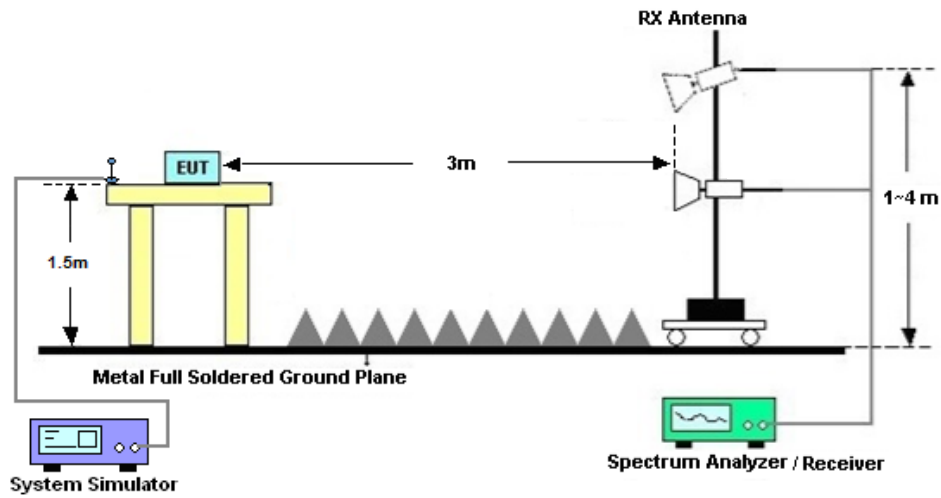
3.2.1 For radiated test below 30MHz



3.2.2 For radiated test from 30MHz to 1GHz



3.2.3 For radiated test above 1GHz



3.3 Test Result of Radiated Test

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

Please refer to Appendix A.



3.4 Field Strength of Spurious Radiation Measurement

3.4.1 Description of Field Strength of Spurious Radiated Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a rotatable wooden table 0.8 meters for frequency below 1GHz and 1.5 meter for frequency above 1GHz above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
12. $ERP \text{ (dBm)} = EIRP - 2.15$
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EXA Spectrum Analyzer	Keysight	N9010B	MY57471079	10Hz-44G,MAX 30dB	Oct. 12, 2022	Nov. 17, 2022	Oct. 11, 2023	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 29, 2022	Nov. 17, 2022	Oct. 28, 2023	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	May 24, 2022	Nov. 17, 2022	May 23, 2023	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1284	1GHz~18GHz	Jan. 05, 2022	Nov. 17, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2022	Nov. 17, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Jan. 05, 2022	Nov. 17, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40G GA	060728	18~40GHz	Jan. 05, 2022	Nov. 17, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18G A	060840	1Ghz-18Ghz	Oct. 12, 2022	Nov. 17, 2022	Oct. 11, 2023	Radiation (03CH04-KS)
Amplifier	Agilent	8449B	3008A02370	1Ghz-18Ghz	Oct. 12, 2022	Nov. 17, 2022	Oct. 11, 2023	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Nov. 17, 2022	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Nov. 17, 2022	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Nov. 17, 2022	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required



5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.3dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.8dB
---------------------------------------------------------------------	-------

----- THE END -----



Appendix A. Test Results of Radiated Test

Radiated Spurious Emission

Test Engineer :	Tank zhang	Temperature :	23~25°C
		Relative Humidity :	41~42%

GSM850 (GSM) -Ant 1								
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1672	-59.73	-13	-46.73	-66.70	1.58	10.70	H
	2510	-42.50	-13	-29.50	-50.75	2.102	12.50	H
	3348	-59.63	-13	-46.63	-68.52	2.856	13.90	H
	4182	-59.78	-13	-46.78	-67.37	3.406	13.15	H
	1672	-51.72	-13	-38.72	-58.69	1.58	10.70	V
	2510	-40.67	-13	-27.67	-48.92	2.10	12.50	V
	3348	-60.15	-13	-47.15	-69.04	2.86	13.90	V
	4182	-58.13	-13	-45.13	-65.72	3.41	13.15	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.